

REMARKS

The Applicant respectfully requests reconsideration and allowance of Claims 1 through 29 in view of the following arguments.

THE CLAIMS ARE NOT OBVIOUS IN VIEW OF THE 682 AND 459 PATENTS

The Examiner rejected Claims 1-10, 12, 13, 15, 21, and 26 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,442,682 issued to Pothapragada, et al. ("682" or "the 682 patent") in view of U.S. Patent No. 5,857,459 issued to Taoda ("459" or "the 459 patent").

The Applicant respectfully traverses these rejections on the ground that the proposed combination does not teach or suggest each and every element required in the present claims.

Claim 1

Element (c) of claim 1 requires the following step.

if the file system access operation request specifies a divertible operation,
diverting the divertible operation from file system processes associated
with the data storage device to the array controller processes.

As indicated at the top of page 3 of the March 3, 2004 Office Action, the Examiner cites the 682 patent as disclosing this step. The Applicant respectfully submits that the Examiner's assessment of the 682 patent is in error, and that the reference does not in fact teach or in any way suggest the step required in element (c) of claim 1.

In supporting the assertion that the 682 patent suggests the step required at element (c) of claim 1, the Examiner points to reference numeral 308 of Figure 1 of the 682 patent and the corresponding text. The description of Figure 1 in the 682 patent begins at Col. 4, line 62 and ends at Col. 5, line 31. This figure and this corresponding text very clearly describe a process by

1 which a file system is optimized based on an analysis of user data and then the computer system
2 is rebooted to load the optimized file system. Figure 1 of the 682 patent and the corresponding
3 text simply do not describe or even suggest a system that is capable of processing certain file
4 system access operations outside of the file system, that is, a system capable of diverting certain
5 file system access operations from the file system processes. In particular, block 308 in Figure 1
6 of the 682 patent simply causes the process to branch to a specific type of file system
7 optimization at block 310 in the event the user data indicates that the user input/output operations
8 are predominantly related to large file random operations. If so the file system is optimized at
9 block 310 to most efficiently process these types of input/output operations.

10 It must be borne in mind that a "divertible operation," as clearly defined in claim 1 and
11 the present application, is a file system access operation. Thus, element (c) of claim 1
12 specifically requires diverting a file system access operation from file system processes
13 associated with the data storage device to the array controller processes. In contrast, the 682
14 patent teaches only optimizing the file system based on user data and then rebooting to mount or
15 load the optimized file system behaviors. With the entire focus of the 682 patent being on
16 optimizing the file system to most efficiently process file system operations, there can simply be
17 no suggestion from the 682 patent of diverting any given file system operation away from the file
18 system processes.

19 The Applicant respectfully submits that the 682 patent does not teach or suggest the
20 limitation required at element (c) of Applicant's claim 1, and thus that the reliance on the 682
21 patent in rejecting claim 1 is in error.

22 The Office Action reliance on the 682 patent for teaching or suggesting elements (d) and
23 (e) of claim 1 is likewise in error. In particular, elements (d) and (e) of claim 1 require:

1 performing the divertible operation with the array controller
2 processes; and
3 updating a file system data management arrangement with
4 operation result information from the array controller processes,
5 the file system data management arrangement being controlled by
6 the file system processes.

7 In suggesting that the step required in element (d) of claim 1 is shown in the 682 patent,
8 the Office Action references Col. 7, lines 13-30 of that patent. However, these two paragraphs
9 refer only to optimizing the file system to more efficiently process certain file system operations.
10 This is clear from the fact that after the operation at block 310 of Figure 1 of the 682 patent (to
11 which Col. 7, lines 13-30 relate) the file system is updated as indicated at block 324 of Figure 1
12 of the 682 patent, and **then the system is rebooted as indicated at block 326**. If the assertions
13 made in the Office Action were correct as to element (d) of claim 1, it would mean that the 682
14 patent requires rebooting after every operation, which is, of course, not a reasonable
15 interpretation of the 682 patent. The text at Col. 7, lines 13-30 of the 682 patent, on which the
16 present rejection relies, does not teach or suggest the step of performing the divertible operation
17 (that is, a file system access operation) with the array controller processes as required by element
18 (d) of claim 1.

19 In suggesting that the step required in element (e) of claim 1 is shown in the 682 patent,
20 the Office Action references "342. fig. :L and corresponding text" of that patent. The Applicant
21 believes this reference in the Office Action was intended to cite block 324 of Figure 1 of the 682
22 patent. However, block 324 of Figure 1 in the 682 patent shows updating the file system with
23 certain optimizing file system options determined from the earlier analysis of user data, and is not

1 a reference to updating the file system after a particular file system access operation is processed.
2 Again this distinction is apparent from the step at block 326 in Figure 1 of the 682 patent in
3 which the system is bebooted to mount or load the optimized file system options. Thus, the 682
4 patent does not suggest updating a file system data management arrangement with operation
5 result information as required in element (e) of claim 1.

6 The secondary reference, the 459 patent, does not in any way make up for the deficiencies
7 of the 682 patent. The 459 patent was cited in the lower half of page 3 of the Office Action to
8 show elements (a) and (b) of claim 1. Although the 459 patent does suggest a data storage
9 system in which the storage devices handle large and small files differently, the 459 patent does
10 not make up for the deficiencies of the 682 patent as to elements (c), (d), and (e). Thus, the
11 combination of the 682 patent and the 459 patent does not teach or suggest elements (c), (d), and
12 (e) of claim 1. Claim 1, therefore, cannot be obvious in view of the 682 and 459 patents, and is
13 entitled to allowance together with its dependent claims, claims 2 through 14.

14 Independent claims 15 and 26 have similar limitations as to the diversion of certain file
15 system access operations from the file system processes. Specifically, element (a) of claim 15
16 requires,

17 "operation detection program code for detecting file system access
18 operations comprising divertible operations and file system access
19 operations comprising non-divertible operations in a received file system
20 access operation request, and for diverting divertible operations from file
21 system processes associated with a data storage device."

22 Element (b) (ii) of claim 26 requires,

1 “data processing means for, if the file system access operation request
2 includes a divertible operation, diverting the divertible operation from file
3 system processes associated with the data storage device to array controller
4 processes executed by the data processing means.”

5 All of the points and arguments as to claim 1 therefore apply with equal force to
6 independent claims 15 and 26. Each of these claims is therefore entitled to allowance together
7 with its respective dependent claims, claims 16 through 20 depending from claim 15, and claims
8 27 through 29 depending from claim 26.

9
10 Claim 21

11 Independent claim 21 is directed to a program product for servicing file system access
12 operation requests from a file system client to a file system. Rather than program code for
13 “diverting” a file system access operation from file system processes to array controller
14 processes, claim 21 requires at element (a) operation detection program code for detecting file
15 system access operations comprising divertible operations in a file system access operation
16 request received from a file system client, and for **preventing each divertible operation from**
17 **being performed by the file system.** Element (b) of claim 21 then requires array controller
18 program code for performing each divertible operation, managing a data storage device including
19 data storage media, and communicating with the file system program code to update a file system
20 data management arrangement in response to the performance of the respective divertible
21 operation.

22 The 682 patent does not teach or suggest any program code for preventing a file system
23 operation from being performed by the file system processes. The 682 patent also does not

1 suggest any program code other than the file system processes for performing a file system access
2 operation. The 459 patent, again, does not make up for these deficiencies in the 682 patent.
3 Although the 459 patent does detect certain types of files to be stored and stores them differently
4 from other files, the 459 patent does not in any way suggest any code for preventing the file
5 system from performing any file system access operation.

6 For these reasons the Applicant submits that claim 21 is entitled to allowance over the
7 cited references together with its dependent claims, claims 22 through 25.

8
9 THE CLAIMS ARE NOT OBVIOUS OVER THE 682 AND 459 PATENTS, FURTHER IN
10 VIEW OF THE VENKATESH PATENT

11
12 The Examiner rejected Claims 11, 14, 17, 23 and 27-29 under 35 U.S.C. § 103(a) as
13 being unpatentable over the 682 and 459 patents, further in view of U. S. Patent 5,974,503 to
14 Venkatesh et al. ("503" or the "503 patent"). The Applicant respectfully traverses these
15 rejections on the ground that the proposed combination does not include each element required in
16 the respective claim.

17 The 503 patent discloses a method and data storage system for maintaining continuous
18 media files such as video files in a RAID system. The disclosure in the 503 patent is primarily
19 directed to how the continuous media files are allocated across media in the RAID system. The
20 503 patent does not teach or suggest any arrangement for diverting file system access operations
21 from the file system processes and performing the file system access operation with array
22 controller processes as required in independent claims 1, 15, and 26 and their respective
23 dependent claims. The 503 patent also does not teach or suggest program code for preventing
24 file system access operations from being executed by the file system processes and array

1 controller program code for executing the file system access operation in lieu of the file system
2 processes as required by claim 21 and its dependent claims.

3 For all of these reasons, nothing in the 503 patent makes up for the deficiencies of the 682
4 patent and 459 patent with respect to the independent claims. Thus, the Applicant submits that
5 all of the present claims are allowable over the 682, 459, and 503 patents.

6 The Examiner cited the 503 patent specifically against the conversion operation required
7 in claims 11, 17, and 23, noting language at Col. 40, lines 35-45 of the 503 patent. It is noted
8 that the referenced paragraph at Col. 40 in the 503 patent does not suggest converting a file
9 system access operation from a byte offset operation to a block access operation. The conversion
10 referenced in that paragraph is from a block access to a time position within a file for a video
11 segment.

12 13 COMMENTS ON THE EXAMINER'S RESPONSE TO ARGUMENTS

14 Beginning at page 9 of the Office Action, the Examiner addressed the arguments
15 presented in the response to the Final Office Action filed December 3, 2003. First, the Examiner
16 agreed that "a file system access operation" as used in the present claims refers to an operation on
17 or for the file system for a particular file defined in the file system. Then the Examiner cites the
18 459 patent at Figure 13, reference character ST21, for the proposition that the 459 patent "reads a
19 file in a file system." Even more curious, the Examiner goes on to state that it was well known at
20 the time of the invention that all file systems dealing with storage and file transfer handled file
21 operations.

22 This last comment by the Examiner indicates a serious misunderstanding or misreading of
23 the present claims. The Applicant is not claiming to have invented file system operations, and

1 the claims of the present application do not merely require file system operations. Rather,
2 referring to the specific requirement of claim 1 for example, the claims require “diverting the
3 divertible operation from file system processes associated with the data storage device to the
4 array controller processes” and “performing the divertible operation with the array controller
5 processes” (elements (c) and (d) of claim 1). That is, the present claims require “diverting” a file
6 system access operation, such as a read operation for example, from the file system processes,
7 and performing that file system access operation with the array controller processes.

8 In contrast to this requirement, none of the references of record in this case, including the
9 682 patent and the 459 patent, teach or suggest diverting any file access operation from the file
10 system processes to storage device controller processes or preventing the file system processes
11 from processing a file system access operation so that the file system access operation may be
12 performed by the storage device controller. In particular, the 459 patent discloses only the
13 processes performed by the disk array apparatus 100 (which corresponds to the array controller
14 103 in Figure 1 of the present application, executing array controller processes). The array
15 controller processes in the 459 patent cause some file data to be stored distributively over
16 multiple physical media and some file data on a single medium. However, this distinction does
17 not in any way represent a diversion of a file system access operation from the file system
18 processes to the array controller processes. It is merely a distinction in the way the array
19 controller processes handle a request made by the file system processes.

20 In the Examiner’s response (at page 10 of the Office Action) to the Applicant’s argument
21 that the file system access operation diversion according to the present invention is not shown in
22 the cited prior art, the Examiner cites the user data analysis block 302 in Figure 1 of the 682
23 patent. Also, the Examiner suggests that in the 459 patent “files and file operations are diverted

1 based on readout file size (fig. 13, ST22, '459) to array controller processes (fig. 1, disk
2 controllers 6-10, group 1 and group2, '459)." As discussed above, the analysis of user data in the
3 682 patent (as indicated at block 302 of Figure 1) is for the purposes of optimizing the file
4 system itself, not diverting operations from the file system. As for the Examiner's comment on
5 the 459 patent, there is no diversion of files to the disk controllers 6-10. The disk controllers 6-
6 10 in the 459 patent always handle the physical reading and writing to the media. The only
7 "diversion" taught by the 459 patent is diversion of data for a file from one disk controller to
8 several to accomplish distributive storage. This sort of diversion, if it can be considered a
9 diversion at all, is clearly not a diversion of a file system access operation from file system
10 processes to array controller processes as required by the present claims.

11 At the bottom of page 10 of the Office Action and carrying over to the top of page 11, the
12 Examiner states disagreement with the Applicant's assertion that the 682 patent does not teach or
13 suggest any program code for preventing a file system operation from being performed by the file
14 system processes. To support the position, the Examiner states,

15 "Patent '682 in view of '459 clearly discloses a program to manage and compare
16 the readout file size (fig. 13, ST22, '459). Patents '682 and '459 do not have any
17 deficiencies when combined together and rejected under 35 USC §103."

18 However, Figure 13 of the 459 patent simply describes a process by which the decision is made
19 to record the data for a file on one disk or on multiple disks, that is, by concentrated
20 recording/storage or by distributed recording/storage. The cited portion of the 459 patent has
21 nothing to do with file system access operation diversion and does not suggest any program
22 product that prevents file system processes from performing a file system access operation.

1 CONCLUSION

2 For all of the above reasons, the Applicant respectfully requests reconsideration and
3 allowance of claims 1 through 29

4 If the Examiner should feel that any issue remains as to the allowability of these claims,
5 or that a conference might expedite allowance of the claims, he is asked to telephone the
6 undersigned attorney.

7 Respectfully submitted,

8 SHAFFER & CULBERTSON, L.L.P.

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By: 

Russell D. Culbertson, Reg. No. 32,124
J. Nevin Shaffer, Jr., Reg. No. 29,858
Trevor Lind, Reg. No., 54,785
1114 Lost Creek Blvd.
Suite 420
Austin, Texas 78746
512-327-8932
ATTORNEYS FOR APPLICANT

20 CERTIFICATE OF FACSIMILE

21 I hereby certify that this correspondence is being facsimile transmitted to the United States Patent and Trademark Office, (Fax
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26 Russell D. Culbertson, Reg. No. 32,124 